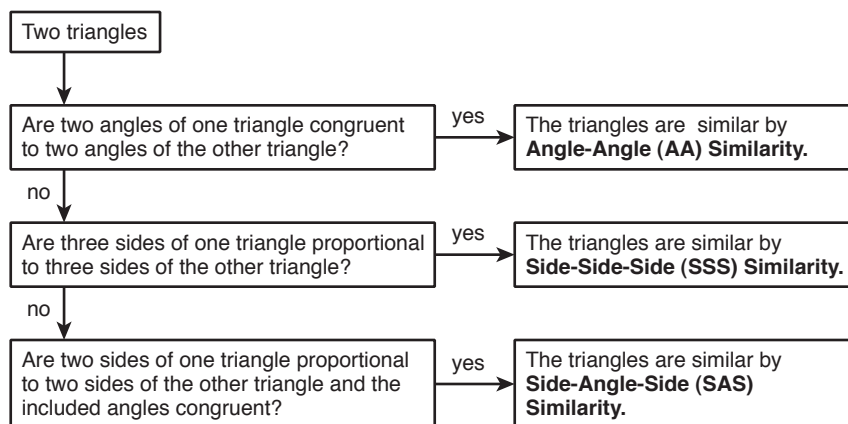


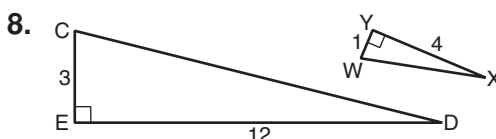
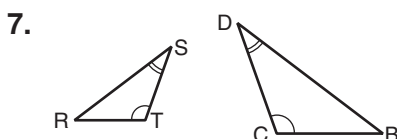
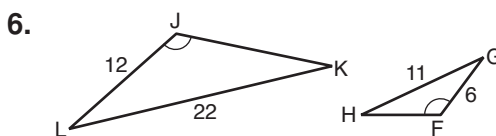
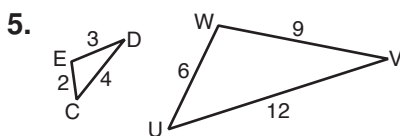
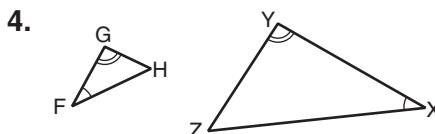
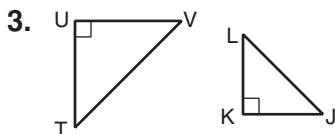
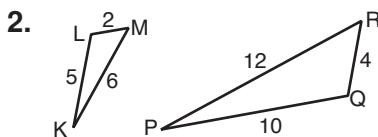
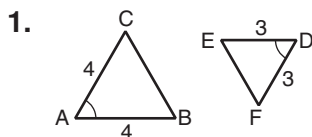
LESSON
7-3

Reading Strategies

Use a Graphic Aid



Use the flowchart to determine, if possible, whether the following pairs of triangles are similar. If similar, write **AA ~**, **SSS ~**, or **SAS ~**—the postulate or theorem you used to conclude that they are similar. If it is not possible to conclude that they are similar, write **no conclusion**.



LESSON Review for Mastery

7-3 Triangle Similarity: AA, SSS, and SAS continued

You can use AA Similarity, SSS Similarity, and SAS Similarity to solve problems. First, prove that the triangles are similar. Then use the properties of similarity to find missing measures.

Explain why $\triangle ADE \sim \triangle ABC$ and then find BC .

Step 1 Prove that the triangles are similar.

$\angle A \cong \angle A$ by the Reflexive Property of \cong .

$$\frac{AD}{AB} = \frac{3}{6} = \frac{1}{2}$$

$$\frac{AE}{AC} = \frac{2}{4} = \frac{1}{2}$$

Therefore, $\triangle ADE \sim \triangle ABC$ by SAS \sim .

Step 2 Find BC .

$$\frac{AD}{AB} = \frac{DE}{BC}$$

Corresponding sides are proportional.

$$\frac{3}{6} = \frac{3.5}{BC}$$

Substitute 3 for AD , 6 for AB , and 3.5 for DE .

$$3(BC) = 6(3.5)$$

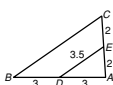
Cross Products Property

$$3(BC) = 21$$

Simplify.

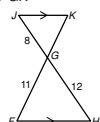
$$BC = 7$$

Divide both sides by 3.



Explain why the triangles are similar and then find each length.

4. GK



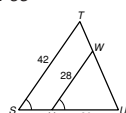
$\overline{JK} \parallel \overline{FH}$, so $\angle J \cong \angle H$, and

$\angle K \cong \angle F$ by the Alt. Int. \triangle Thm.

$\triangle JGK \sim \triangle HFG$ by AA \sim .

$$GK = 7\frac{1}{3}$$

5. US



It is given that $\angle S \cong \angle W$.

$\angle U \cong \angle U$ by the Reflex. Prop.

of $\triangle SVU \sim \triangle TWU$ by AA \sim .

$$US = 39$$

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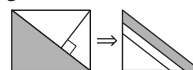
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Holt Geometry

LESSON Challenge

7-3 Similar Triangles Within a Right Triangle

Take a rectangular sheet of paper and draw the segments shown at right. Cut out the three triangles and align them as shown. If your work is accurate, the triangles should appear similar. In fact, you have demonstrated the following important theorem about right triangles.



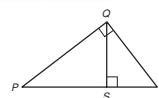
RIGHT TRIANGLE ALTITUDE THEOREM

In a right triangle, the altitude from the vertex of the right angle to the hypotenuse forms two triangles that are similar to the given triangle and to each other.

Complete the following proof of the Right Triangle Altitude Theorem.

Given: $\triangle PQR$ is a right angle.
 QS is the altitude of $\triangle PQR$ drawn from the right angle.

Prove: $\triangle PSQ \sim \triangle PQR$; $\triangle QSR \sim \triangle PQR$; $\triangle PSQ \sim \triangle QSR$



Statements	Reasons
$\angle PQR$ is a right angle.	
QS is the altitude of $\triangle PQR$ drawn from the right angle.	1. Given
$QS \perp \overline{PR}$	2. Definition of altitude
$\angle PSQ$ and $\angle QSR$ are right angles.	3. Definition of perpendicular
$m\angle PSQ = m\angle QSR = m\angle PQR = 90^\circ$	4. Definition of right angle
$\angle PSQ \cong \angle PQR$; $\angle QSR \cong \angle PQR$	5. Definition of congruent angles
$\angle P \cong \angle P$; $\angle R \cong \angle R$	6. Reflexive Property of Congruence
$\triangle PSQ \sim \triangle PQR$; $\triangle QSR \sim \triangle PQR$	7. AA Similarity Postulate
$\triangle PSQ \sim \triangle QSR$	8. Transitive Property

9. a. Name all pairs of similar triangles in the figure at the right.

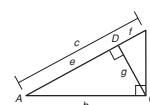
$$\triangle ACD \sim \triangle ABC; \triangle CBD \sim$$

$$\triangle ABC; \triangle ACD \sim \triangle CBD$$

b. Complete each proportion: $\frac{a}{f} = \frac{c}{a}$ and $\frac{b}{g} = \frac{c}{b}$

c. On a separate sheet of paper, write a proof of the Pythagorean Theorem that utilizes the figure above and your results from parts a and b. (Hint: Apply the Cross-Multiplication Property to the proportions and add the resulting equations.)

Proofs will vary.



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Holt Geometry

LESSON Problem Solving

7-3 Triangle Similarity: AA, SSS, and SAS

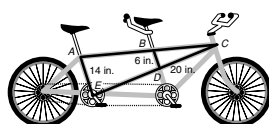
Use the diagram for Exercises 1 and 2.

In the diagram of the tandem bike, $\overline{AE} \parallel \overline{BD}$.

1. Explain why $\triangle CBD \sim \triangle CAE$.

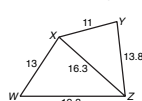
$\angle CBD \cong \angle CAE$ by Corr. \angle Thm.

and $\angle C \cong \angle C$ by the Reflex. Prop. of \cong . So $\triangle CBD \sim \triangle CAE$ by AA \sim .



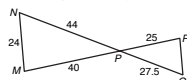
2. Find CE to the nearest tenth. 46.7 in.

3. Is $\triangle WXZ \sim \triangle XYZ$? Explain.



$$\text{No; } \frac{WX}{XY} \neq \frac{XZ}{YZ}$$

4. Find RQ . Explain how you found it.



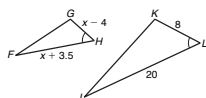
$$15; \triangle MNP \sim \triangle RQP \text{ by SAS } \sim.$$

Corr. sides of $\sim \triangle$ are

proportional.

Choose the best answer.

5. Find the value of x that makes $\triangle FGH \sim \triangle JKL$.



A 8

C 12

B 9

D 16

6. Triangle STU has vertices at $S(0, 0)$, $T(2, 6)$, and $U(8, 2)$. If $\triangle STU \sim \triangle WXY$ and the coordinates of W are $(0, 0)$, what are possible coordinates of X and Y ?

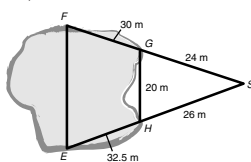
F $X(1, 3)$ and $Y(4, 1)$

G $X(1, 3)$ and $Y(2, 0)$

H $X(3, 1)$ and $Y(2, 4)$

J $X(0, 3)$ and $Y(4, 0)$

7. To measure the distance EF across the lake, a surveyor at S locates points E , F , G , and H as shown. What is EF ?



A 25 m

C 45 m

B 36 m

D 90 m

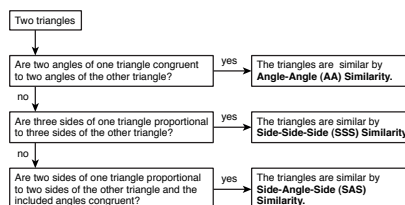
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Holt Geometry

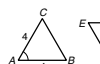
LESSON Reading Strategies

7-3 Use a Graphic Aid



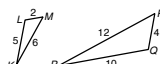
Use the flowchart to determine, if possible, whether the following pairs of triangles are similar. If similar, write AA \sim , SSS \sim , or SAS \sim —the postulate or theorem you used to conclude that they are similar. If it is not possible to conclude that they are similar, write *no conclusion*.

1.



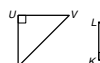
SAS \sim

2.



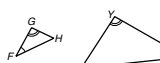
SSS \sim

3.



no conclusion

4.



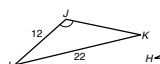
AA \sim

5.



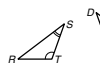
SSS \sim

6.



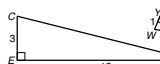
no conclusion

7.



AA \sim

8.



SAS \sim

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